

Operating and mounting manual automatic shut off valve solenoid-valve EKVS

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1.0 General Remarks

This operating manual includes instructions to assemble and operate the valve in the prescribed and safe way. **Additionally, the adequate operation instructions of each special solenoid drive must be considered.**

Series MG...	220.100.038
Series MG...X	220.100.040
Series MG...Xme	220.100.039

If any difficulties appear that can not be solved by means of the operating manual, further information may be demanded from the manufacturer.

This operating manual is in accordance with the relevant valid EN safety standards and the valid prescriptions and rules of the Federal Republic of Germany.

If the solenoids are used abroad of the FRG, the operator and/or the person who is responsible for the plant concept must take care that the valid national rules are met.

The manufacturer reserves the right of any technical change and improvement.

The use of these operating instructions suppose the qualification of the user according to paragraph 2.3 "qualified staff". The operating staff must be trained in accordance with the operating instructions.

The operating manual must always be available at the location where used.

1.1 Valve data

Manufacturer:

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Designation

Forced operated, normally closed NC, spring-loaded automatic shut off valve with solenoid drive.

Working pressure:	16-EKVS...	0 - 16bar
	25-EKVS...N(H)..	0 - 25bar
	40-EKVS...N(H)..	0 - 40bar

Medium temperature: -20°C to + 140°C

Medium temperature: -20°C to + 60°C (with Ex-protected drives (zone 1))

Ambient temperature: -20°C to + 60°C

Fitting position: vertical drive (W-design with horizontal drive)

Switching cycles: see operating instructions solenoid drive

Threaded connection dimension at DIN ISO 228-1

Connetion G	3/8 (3)	1/2 (5)	3/4 (7)	1 (10)	1 1/4 (12)	1 1/2 (15)	2 (20)	2 1/2 (25)	Test pressure (*) PT
16-EKVS....	O	O	O	O	O	O	O	O	PT25

Flange connection measures acc. to DIN EN 1092-2 / ANSI

Flange DN	PN	15 (5N)	20 (7N)	25 (10N)	32 (12N)	40 (15N)	50 (20N)	65 (25N)	80 (30N)	100	125	150	Test pressure (*) PT
25-EKVS...N(H)...	25	O	O	O	O	O	O	O	O	O	O	O	PT40
40-EKVS...N(H)...	40	O	O	O	O	O	O	O	O	O	O	O	PT40

(*) Test pressure to perform leakage test "No FUNCTION TEST"

O Acceptance test certificate 3.2 possible, - not available

Voltage: VDC 12 – 440 (–15% to +10%)
VAC 24 – 500 (–15% to +10%)

Protection type: IP54 or IP65

Frequency 40 – 60 Hz

Power 10 – 4000W

Details to the electrical data can be found on the type sign and the adequate operation instruction of the solenoid valves.

1.2 Application

The solenoid-valves EKVS are used as forced operated automatic shut off valves in pipelines.

Qualified for fuel oil EL, M and other neutral liquids having a viscosity rate up to 75mm²/s. Not suitable for heavy heating oil S.

The valves are suitable for liquids with a particle size of max. 1mm.

If used in other cases, the operator must carefully check if construction/design of valve, accessories and materials are suitable for the new application. The range of application is subject to the responsibility of the plant planner. The service life of the valve is 20 years.

2.0 Danger Notices

2.1 Safety terms

The signal terms DANGER, CAUTION und NOTICE are used in this operating manual in case of notices concerning special dangers, or for unusual information, requiring a special marking.



DANGER! means that in case of non-observance there is danger to life and/or considerable damage.



CAUTION! means that in case of non-observance there is danger of injury and/or damage.



NOTICE! means that attention is drawn to technical correlations/connections.

Observance of other, not especially marked notices concerning transport, assembly, operation and maintenance and other data (in the operating manual, product documentation and at the unit itself) is also essential, in order to avoid disturbances that might affect direct or indirect damage to property or injury to persons.

2.2 Safety notice

Non observance of safety instructions can lead to loss of any claim for damages.

Non observance can lead to the following mentioned dangers:

- Failure of important functions of the valve/plant
- Endangering of persons by electrical or mechanical influences.
- Protection against accidental contact for moving parts may not be removed as long as the valve is in operation.
- Leakage of dangerous media (e.g. explosive, toxic, hot) must be removed in the way that there is no danger for persons or environment. Laws and regulations must be observed.

2.3 Qualified staff

These are persons who are familiar with erection, assembly, starting, operation and maintenance of the product and who have special qualifications acc. to their activities and functions, e.g.:

- Instruction and obligation to carry out and meet all regional and in-house orders and requirements.
- Education or instruction according to the safety engineering standards in use and maintenance of adequate safety and working protection equipment.
- Training in first aid.

2.4 Unauthorized modification and spare part production

Modification or changes of the valve are only allowed after agreement of the manufacturer. Original drawings and accessories authorized by the manufacturer are for safety purposes. The use of other parts or unauthorized changes at the valve by third persons may cancel and abolish the manufacturer's liability for resulting consequences.

2.5 Unauthorized operation

Operational reliability of the delivered valve is only guaranteed in case of determined use in accordance to paragraph 1 of the operating manual. **The application limits mentioned on the type sign may on no account be exceeded.**

2.6 Safety information for the use in explosion-prone areas guideline 2014/34/EU

- The temperature of the medium must not exceed the respective temperature class, and respectively, the respective maximum permitted medium temperature as per operation guideline.
- If the valve is heated (e.g. heating jacket), care must be taken, that the specified temperature class is kept in the time.
- The valve must be connected to the ground.
In the case most simple this can be realized via pipe screws by means of tooth disc.
Otherwise the connection to the ground must be implemented by other measures e.g. cable links.
- Control valves, electrical and electrical/mechanical drives as well as sensors must undergo a separate conformity check as per ATEX. In doing so the respective safety and explosion protection information in the operation instructions are to taken into special consideration.
- Any modifications whatsoever to the valve are not allowed. The ATEX approval is void with immediate effect if the valve is modified without prior authorisation (even including painting).
- UNI-Geräte GmbH must be consulted before any modifications are made.

Furthermore we point out the guideline 1999/92/EG, which include the minimum regulations for the improvement of the health-related situation and the safety of the employees, who might be jeopardized by an explosive atmosphere.

2.7 Safety information regarding guideline 2014/68/EU attachment I



Danger!

UNI valves are not an accessory with a safety function as defined in the PED 2014/68 / EU Article 2 (4) and Article 4 (1) (d) by category IV
Use or classify!

3.0 Handling

3.1 Transport

For any transport works, the generally recognised technical rules and standards as well as rules for prevention of accidents must be observed.

In case of transport, storage and stopping, the flange protection caps must be mounted at both valve flanges.

The goods to be transported must be carefully treated. During transport, the valve must be protected against strokes, impacts or vibration. The coat of lacquer may not be damaged. Transport temperature is -20°C up to $+60^{\circ}\text{C}$.

Never transport the valve at screwed cable glands, appliance plugs or add-on units. The valve can be transported at ring nuts, flange borings or by means of a belt under the solenoid drive.

Transport the valve in a case or on a pallet with smooth base and put it softly on plain floor. **Never put the valve on limit switch box.**

The goods must be checked on completeness and transport damage. See also section 9.0

3.2 Storage

If the valve is not installed immediately after delivery, it must be stored properly.

- Storage temperature -20°C up to $+60^{\circ}\text{C}$, dry and clean.
- The lacquer protects against corrosion in neutral dry atmosphere. Do not damage colour.
- In humid rooms, a drying agent or a heating resp. is necessary because of condensation of water.

Requirements according to DIN 7716 (products made of caoutchouc and rubber) must be met.

3.3 Handling before mounting

- In case of valve with protection caps, they must be removed before being mounted!
- Protect against atmospheric influences such as humidity (otherwise use drying agent).
- Appropriate treatment protects against damage.

4.0 Product Description

The solenoid valves in the EKVS series are forced operated, normally closed NC, spring-loaded automatic shut off valves with solenoid actuator.

Sectional drawing 11.1 Fig. 1 to Fig. 2 shows the valve construction.

4.1 Function

The pressurized medium flows through minimise side bore hole of the balance piston (220) and fills the volume above the balance piston (220).

Opening:

With Switching on the solenoid drive (800) the solenoid core (207) with valve pin (214) is lifting and the middle bore hole is unblock in the balance piston (220), this bore hole is larger than the side bore hole. In consequence of this action there is a pressure drop on top of the balance piston (220). The medium pressure lifts the balance piston (220) and opens the valve cross section. The valve is open.

Closing:

(with existing medium pressure)

After switching off the voltage of the solenoid drive (800), the solenoid core (207) with the valve pin (214) drop. It drop with the force of the pressure spring (503/x) and the self-weight of the balance piston (220) and block the middle bore hole in the balance piston (220).

In consequence of this action the pressure is growing up on top of the balance piston (220). The balance piston with the seat sealing (400) is press on the valve seat and drain off the flow of the fluid. The valve is close.

4.2 Technical data

Opening times: 0,3 – 0,7s
Closing times: < 1s

Solenoid –drive types MG...

Connection G	3/8 (3)	1/2 (5)	3/4 (7)	1 (10)	1 1/4 (12)	1 1/2 (15)	2 (20)	2 1/2 (25)
16-EKVS....	005-3	005-3	010	010	012	012	012	014

Flange DN	15 (5N)	20 (7N)	25 (10N)	32 (12N)	40 (15N)	50 (20N)	65 (25N)	80 (30N)	100	125	150
25-EKVS...N(H)...	010	010	010	012	014	014	016	018	019A5	018A1	018A2
40-EKVS...N(H)...	010	010	010	012	014	014	016	018	019A5	018A1	018A2

Drive types with "A" consist of pickup and holding winding

Max. valve loading by pipe power

The indicated moments may not work longer than 10s.

DN	8	10	15	20	25	32	40	50	65	80	100	125	≥150
Torsion Nm	20	35	50	85	125	160	200	250 ¹⁾	325 ¹⁾	400 ¹⁾	-	-	-
Bending Nm	35	70	105	225	340	475	610	1100	1600	2400	5000	6000	7600

¹⁾ Not valid in case of valves with flanges

Starting torque, pipe screws greased

DN	8	10	15	20	25	32	40	50	65	80	100	125	≥150
Torque Nm	20	30	30	30	30	50	50	50	50	50	80	160	160

Starting torque, product screws and nuts greased

Screw	M6	M8	M10	M12	M16	M20	M24
Torque Nm	5	11	22	39	70	110	150

4.3 Marking

The type sign on the solenoid drive has the following information:

- Fabricator
- Valve type, nominal width, pressure and temperature indication, fitting position
- Year of construction/ production no.
- Valve class and valve group acc.
- CE-sign and no. of relevant location
- Fluid group and test pressure PT
- Solenoid drive type
- Electr. performance
- Voltage
- Frequency
- Protection type

When using solenoid drives for ex-protection zone 1 refer to information in the valid operation instruction.

Refer also to section 10.0.

5.0 Installation

5.1 Warning of dangers during installation, operation and maintenance



DANGER!

Safe operation of the valve can only be guaranteed if it is installed, commissioned and maintained by qualified personnel (see point 2.3 "Qualified staff") correctly and in observance of the warnings in this operating manual. Apart from that, the operation safety order and the qualified use of tools and protection equipment must be guaranteed. The operating instructions for the valve must be observed during all work on or with the valve. Failure to observe these instructions may result in injury or in damage to the valve or other installations.

When the valve is used as a final sealing element, a safety precaution e.g. blanking disc, blind flange, etc., in accordance with the code of practice of the German Technical and Scientific Association for Gas and Water (DVGW) is recommended during all repair work.

5.2 Installation

Apart from the general installation guidelines, the following points should be observed:



NOTICE!

- Remove the flange covers.
- The inside of the valve and the pipeline must be free from foreign particles.
- Observe the installation position in relation to the flow direction, see markings on the valve.
- Centre gaskets between the flanges.
- The connecting flanges must be aligned.
- Ensure that none of the components is strained during installation.
- The valve must not be used as a fixed point; it is supported by the pipework system.
- Protect valves from soiling, particularly during construction work.
- Thermal expansion of the pipework must be equalized using compensators.



NOTICE!

Please observe the solenoid drive operating instructions.

6.0 Operation



DANGER!

Before commissioning a new installation or before starting up an installation again after repairs or modifications, ensure:

- The proper completion of all installation and assembly work!
- Commissioning only by “qualified staff” (see point 2.3).
- Installation or repair of existing guards and protection equipment.

6.1 Commissioning

- Before commissioning, check the data on material, pressure, temperature and flow direction with the layout plan of the pipework system.
- Depending on the field of application, the local regulations have to be observed, e.g. the operation safety order.
- Residues in the pipework and the valve (dirt, weld beads, etc.) will inevitably result in leaks.
- Leakage inspection of the installed valve.

6.2 Shutting down

- Depending on the field of application, the local regulations have to be observed, e.g. the operation safety order.

6.3 Maintenance

Solenoid-valves have to be checked at regular intervals for proper function and internal leak tightness. The intervals for regular inspections have to be defined by the operator according to the operating conditions. UNI-Geräte recommends an internal visual inspection once a year and an overhaul of the valve after 2 years or after the following number of switching cycles at the latest:

Application temperature	DN ≤ 25	≤ DN 80	≤ DN 150	> DN 150
≤ 25°C	150 000	75 000	25 000	20 000
> 25°C	50 000	25 000	25 000	5 000

Repair or maintenance works at the manufacturing company (UNI- Geräte)

- Valves and fittings must be delivered clean and free from substances which are harmful to health or to the environment.

6.4 Putting back into operation

When putting a valve back into operation, ensure that all the necessary steps described in section 5.2 (Installation) and section 6.1 (Commissioning) are repeated.

7.0 Troubleshooting

7.1 Detection of defects



DANGER!

Be sure to observe the safety instructions during troubleshooting.

If the malfunctions cannot be remedied using the following “**Troubleshooting plan (7.2)**” please contact the manufacturer.

In the event of faults in the function or operating behaviour of the valve, check whether the installation work was carried out and completed as described in this operating manual.

Depending on the field of application, the operation safety order must be observed.

Check the data on material, pressure, temperature, voltage and flow direction with the layout plan of the pipework system. In addition, check whether the operating conditions correspond to the technical data in the data sheet or on the rating plate.

7.2 Troubleshooting plan

Malfunction	Possible causes	Remedy
No flow	Valve does not open	Switch on solenoid drive (800) Check operating voltage
	Working pressure too high	Compare working pressure with the data on the rating plate
	Flange covers were not removed	Remove flange covers
Low flow rate	Clogging in the pipework system	Check pipework system
Valve leaking at seat, no internal tightness	Valve seat gasket (400) or valve seat (100) damaged by external particles	See section 8 replace valve
No external tightness	Gaskets damaged	See section 8 replace valve
Valve does not close	Connected voltage too high	Check whether there is residual voltage, see section 4.1
Flange fracture (valve/ pipework)	Screws not tightened uniformly, mating flanges not aligned	Align pipework. Install new valve



NOTICE!

Observe section 9.0 before all installation and repair work!

Observe section 6.4 when putting the valve back into operation!

8.0 Replacement of the valve

In addition to the general installation guidelines and the operation safety order, the following points must also be observed:



DANGER!

- Depressurised pipework system
- Cooled medium
- Emptied installation
- Vent pipework systems containing corrosive, inflammable, aggressive or toxic media
- Have dismantling work carried out only by qualified staff (see point 2.3)

8.1 Replacement of the solenoid drive

Shut down the valve as described in section 6.2.

Switch off and dismantle the solenoid drive as described in the operating manual of the solenoid drive.



DANGER!

After continuous operation, the solenoid drive may be hot! Danger of burns!

Flanged version

Fig. 1 25/40-EKVS..N(H)... (DN 15 – DN 150)

Replace the complete valve

Threaded version

Fig. 2 16-EKVS... (G 3/8" – G 2 1/2")

Replace the complete valve

9.0 Warranty

Scope and period of the warranty is specified in the edition of the "General Terms of Business of the UNI-Geräte E. Mangelmann Elektrotechnische Fabrik GmbH" valid at the time of delivery or else in the purchase agreement.

We warranty that the valve is free from faults in line with the state of the art and for the confirmed field of application.

No warranty claims will be accepted for damage resulting from improper use or failure to observe these operating and installation instructions, the statutory accident prevention regulations, the EN, DIN and VDE standards and other codes and regulations.

Warranty claims will also not be accepted for damage occurring during operation due to operating conditions deviating from those specified in the data sheet or in other agreements.

Justified complaints will be remedied by reworking by us or specialist companies authorised by us.

Claims going beyond the scope of the warranty will not be accepted. The customer shall have no right to the supply of a replacement valve.

Maintenance work, installation of parts from other manufacturers, any modifications to the design and natural wear are not covered by the warranty.

Transport damage must be reported not to us but **without delay** to your responsible goods handling company, the railway company or the shipping agent as otherwise all claims for damages against these companies will be voided.

10.0 Explanations on Codes and Directives

The Commission of the European Union has laid down common directives resp. regulations for the free trading of goods within the Union specifying minimum requirements for safety and health protection. The CE symbol confirms that products comply with the EU directives resp. regulations, i.e. in conformity with the relevant, in particular harmonised standards. Directive 2014/68/EU applies to the valve (mechanical part).

Notes on Directive 2014/68/EU (Pressure Equipment Directive, DGRL):

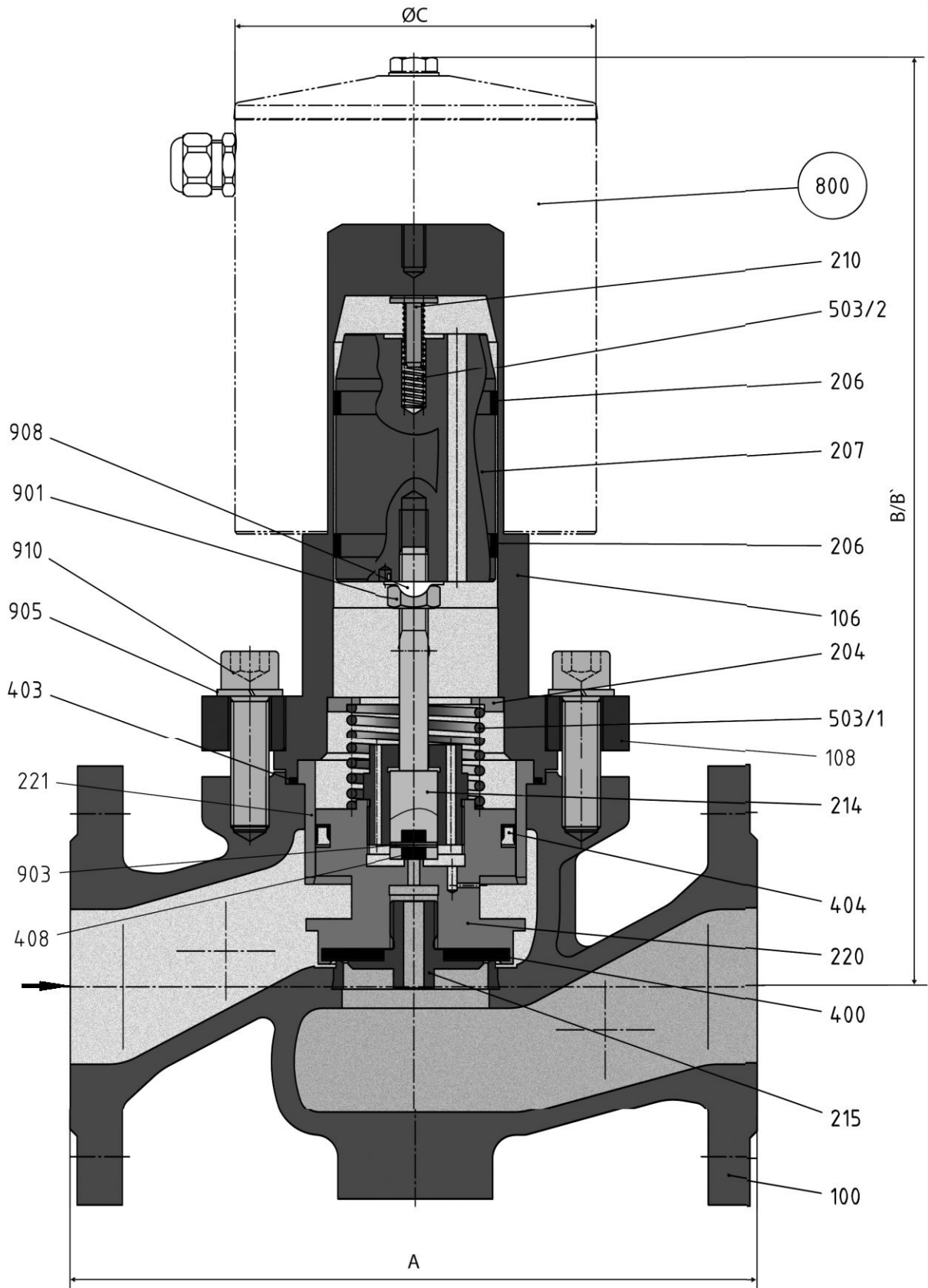
It has been confirmed that the quality assurance in design control, manufacture and final acceptance of the manufacturer, UNI-Geräte E. Mangelmann Elektrotechnische Fabrik GmbH, satisfy the requirements of 2014/68/EU Article 14 Module H. The valves comply with the fundamental requirements of Directive 2014/68/EU. Valves in according to Article 1 Paragraph 2,f,v or Article 4 paragraph 3 are not allowed to have the CE Mark in according to Article 18.

Note concerning ex-guideline 2014/34/EU (explosion guideline ATEX):

The product is not subject to guideline 2014/34/EU, since due to the loads occurring during practical operation, there is no effective source of ignition even in case of an error case to be assumed. This also applies to spring-loaded components in the medium-conveying space. In case of electric drives, sensors or other electric components the application as per 2014/34/EU is to be checked separately.

11.0 Drawing

11.1 Fig.1 Flange design: 25/40-EKVS..N(H)... DN15 – DN150



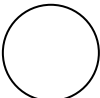
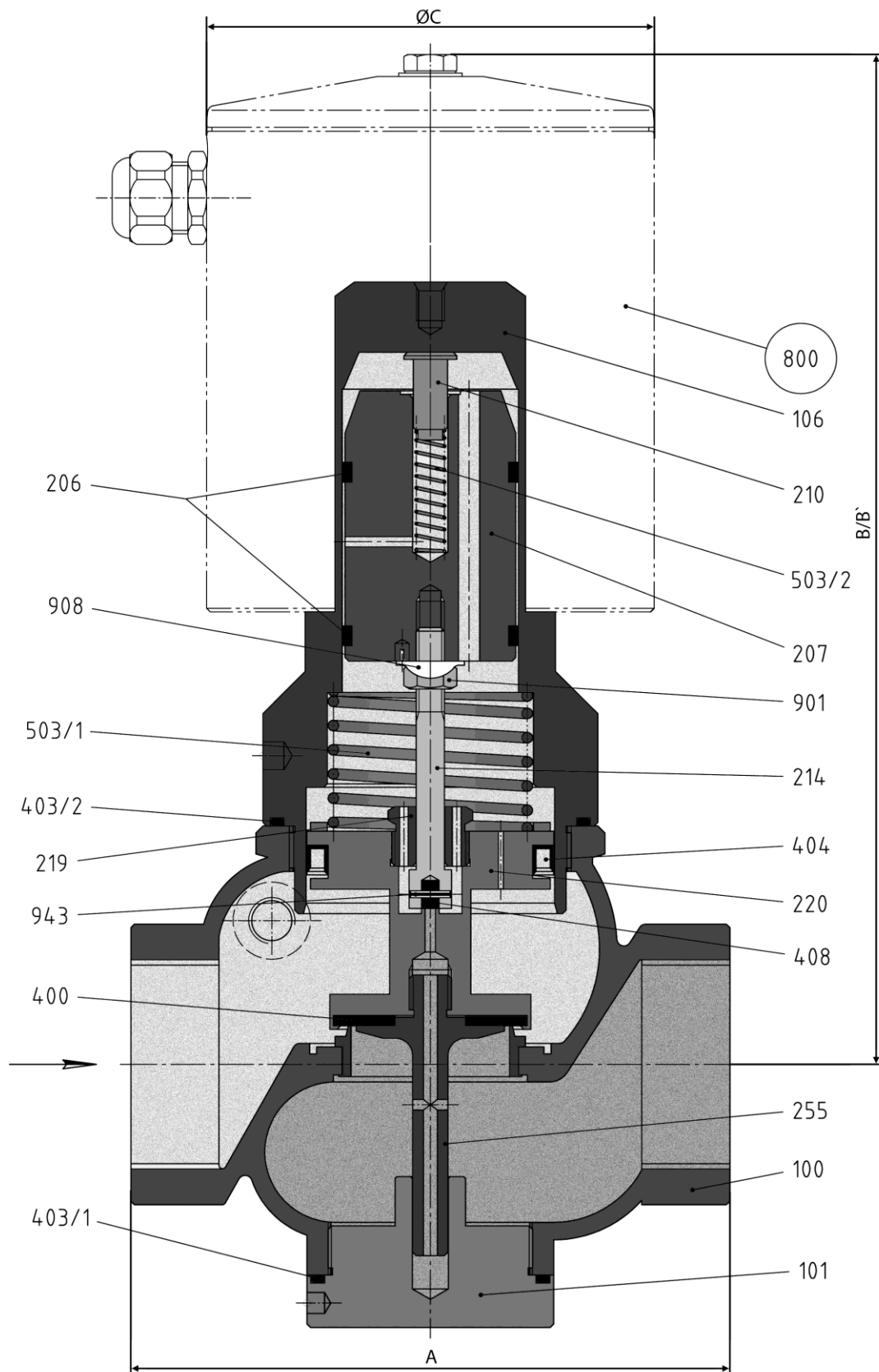
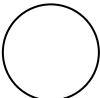
 = Spare part

Fig.2 Threaded version: 16-EKVS.... G 3/8 – G 2 1/2



 = Spare part

11.2 List of parts

Pos./ Item	Stück/ Qty.	Benennung	Description
100	1	Ventilgehäuse	Valve chamber
101	1	Gehäusemutter	Housing nut
106	1	Oberteil	Upper part of housing
108	1	Gehäuseflansch	Housing flange
204	1	Federführung	Spring guide
206	2	Führungsring	Guide ring
207	1	Magnetkern	Solenoid core
210	1	Federbolzen	Spring bolt
214	1	Ventilstift	Valve pin
215	1	Tellerschraube	Plate screw
219	1	Spindelmutter	Spindle nut
220	1	Ausgleichskolben	Balance piston
221	1	Kolbenführung	Piston guide
255	1	Führungsteil	Guide piece
400	1	Ventiltellerdichtung	Valve disc seal
403	1	O-Ring	O-ring
403/1	1	O-Ring	O-ring
403/2	1	O-Ring	O-ring
404	1	Lippenring	Lip-ring
408	1	Dichtungsrippel	Sealing nipple
503/1	1	Druckfeder	Pressure spring
503/2	1	Druckfeder	Pressure spring
800	1	Magnet-Antrieb	Solenoid drive
901	1	Sechskantmutter	hex. nut
903	1	Kerbstift	grooved dowel pin
905	4/6/8	Federring	Lock washer
908	1	Sicherungsblech	Safety plate
910	4/6/8	Zylinderschraube	Cylinder head screw
943	1	Spannstift	Spring dowel sleeve

Spare part

Version	Fig.	Type	Spare part
Flange version	Fig. 1	25-EKVS 5N(H).. – 150(H).. 40-EKVS 5N(H).. – 150(H)..	Solenoid drive (800)
Thread version	Fig. 2	16- EVSA 3.. – 25..	Solenoid drive (800)

Dimension with standard solenoid drive

Connection G	Dimension	3/8 (3)	1/2 (5)	3/4 (7)	1 (10)	1 1/4 (12)	1 1/2 (15)	2 (20)	2 1/2 (25)
Baulänge	A	80	80	95	105	120	150	170	180
16-EKVS	B	185	185	220	230	270	285	290	345
	B`	245	245	308	318	367	382	387	465
	ØC	80	80	127	127	127	127	127	153

Flange DN	Dimension	15 (5N)	20 (7N)	25 (10N)	32 (12N)	40 (15N)	50 (20N)	65 (25N)	80 (30N)	100	125	150
Baulänge	A	130	150	160	180	200	230	290	310	350	400	480
25-EKVS..N(H)...	B	290	300	300	335	360	385	395	430	460	475	505
	B`	378	388	388	432	480	505	529	582	612	627	657
	ØC	127	127	127	127	153	153	153	191	191	191	191
40-EKVS..N(H)...	B	290	300	300	335	360	385	395	430	460	475	505
	B`	378	388	388	432	480	505	529	582	612	627	657
	ØC	127	127	127	127	153	153	153	191	191	191	191

A = Dimension at DIN (resp. flanges ANSI and dimension DIN or flanges and dimension at DIN)

B` = Dimension for removing the solenoid drive

Dimension B and diameter C change for solenoid drives for explosion-proof zone 1.